

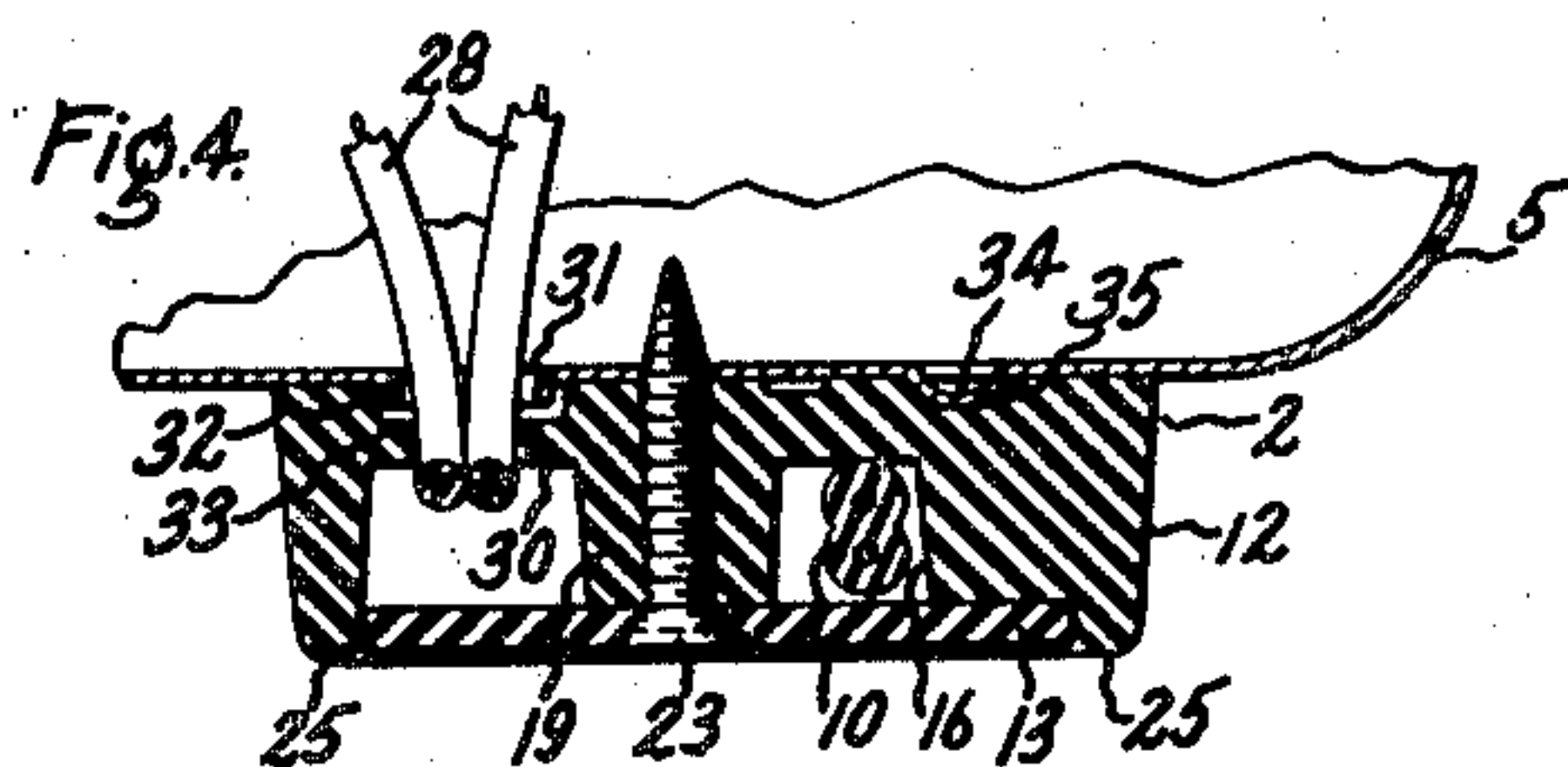
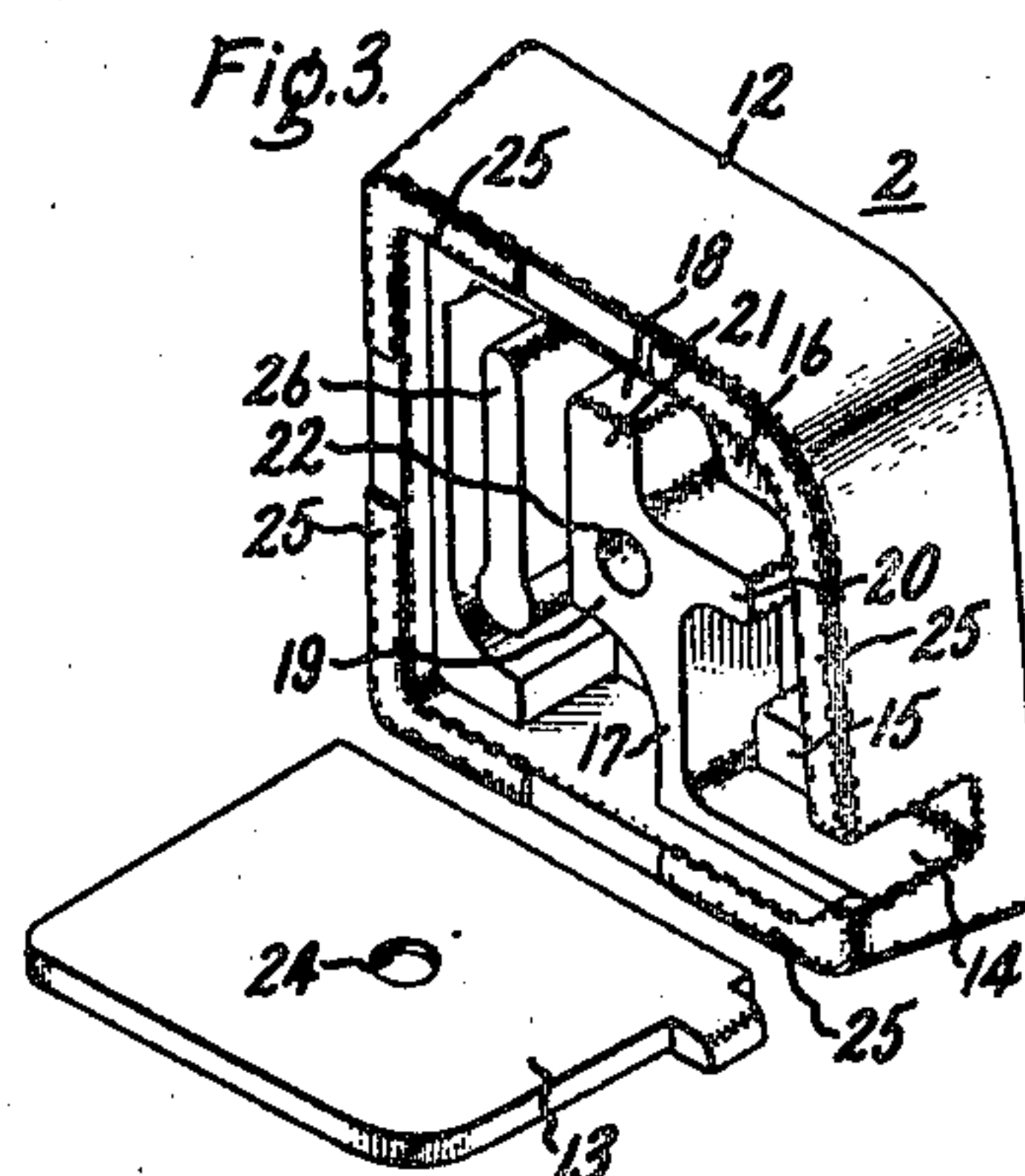
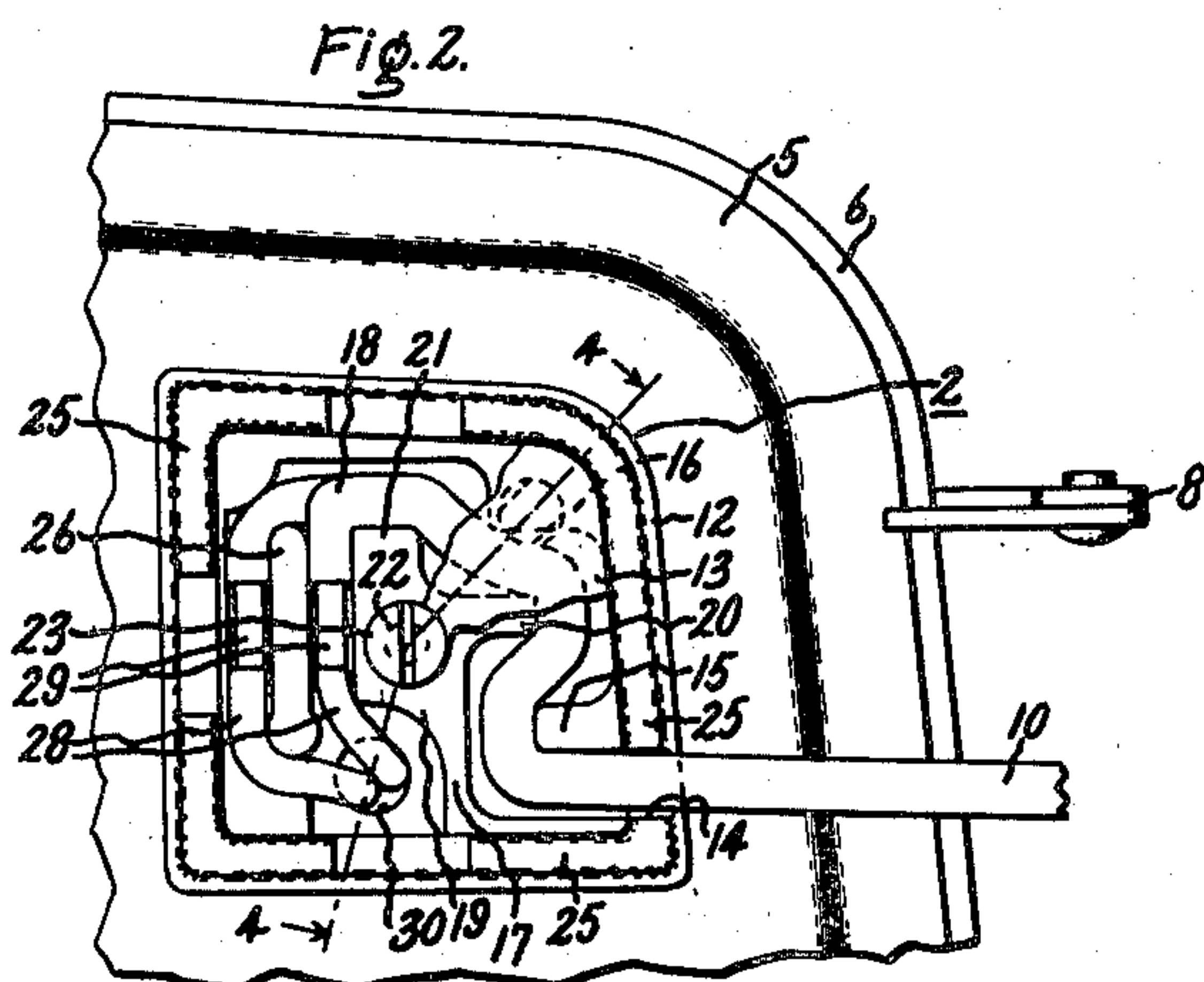
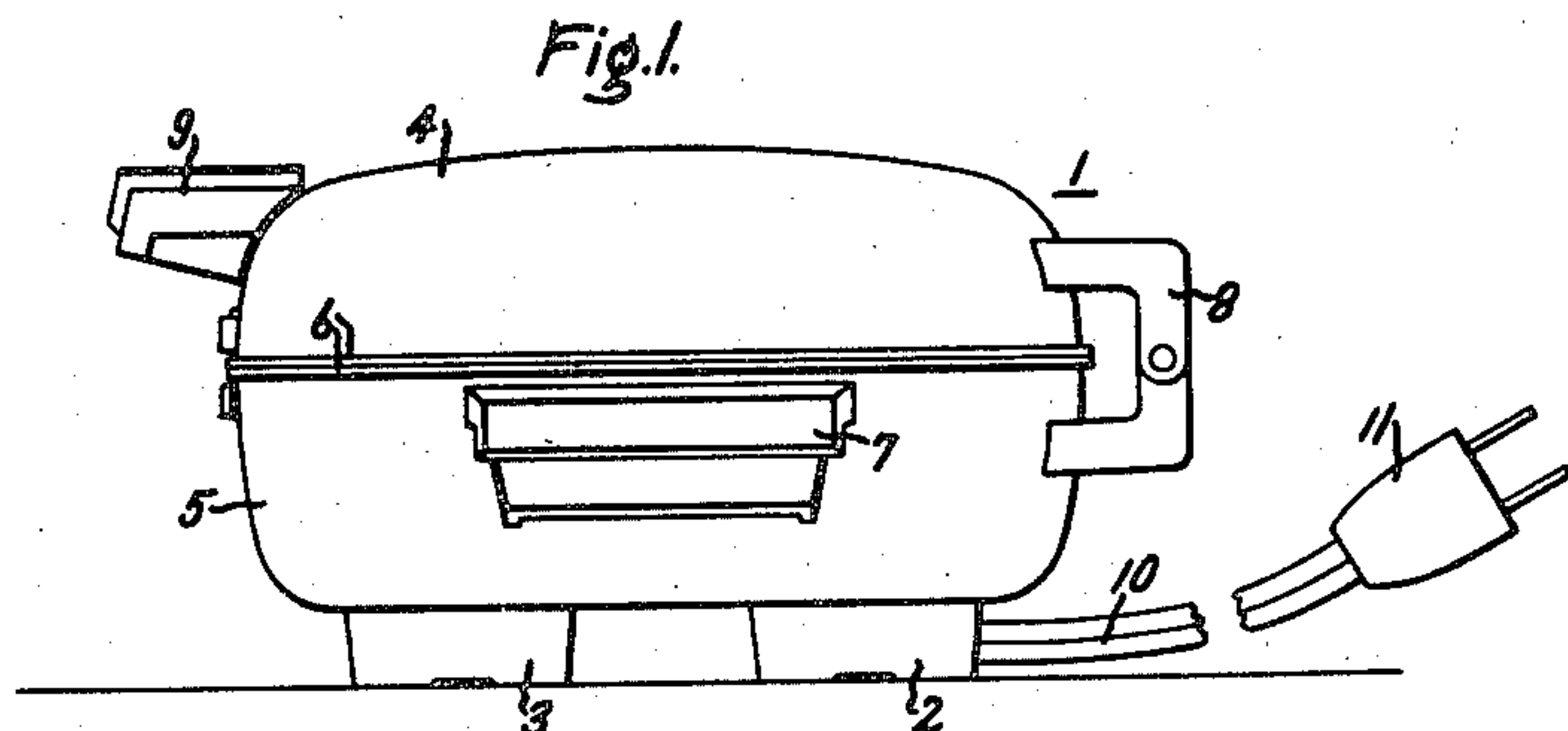
March 6, 1951

H. H. MILLER

2,544,343

CONNECTOR BLOCK WITH STRAIN RELIEF

Filed Feb. 11, 1950



Inventor:
Homer H. Miller,
by *Shirley A. Beyer*
His Attorney.

UNITED STATES PATENT OFFICE

2,544,343

CONNECTOR BLOCK WITH STRAIN RELIEF

Homer H. Miller, Bridgeport, Conn., assignor to
General Electric Company, a corporation of
New York

Application February 11, 1950, Serial No. 143,727

1 Claim. (Cl. 173—322)

1

This invention relates to a support for electrical appliances, but is more particularly useful in electrical heating appliances such as waffle irons or sandwich grilles where the support also serves as an entrance housing for the electrical cord through which power is supplied to the appliance.

Means must be provided for heat insulation between the body of an appliance of the above description and a supporting surface which may have a finish that will be damaged by the heat of the appliance. This heat insulation means often comprises supports of a suitable heat insulation material, such, for instance, as a molded phenolic resin. Electrical insulating means must also be provided for the electrical interconnections between the power lead-in conductors for bringing power into the heating device and the electrical heater elements within the device which are of an entirely different structure. These interconnections are often insulated and supported by means of a small terminal board. Means must further be provided for restraining longitudinal movement of the lead-in conductors with respect to the heating device. This feature is often referred to as strain relief. Strain relief is necessary in order to prevent outward movement of the lead-in conductors, or a pull thereon, from causing a disconnection between the lead-in conductors and the heater element or from causing movement of the heater element out of its proper operating position within the device. The strain relief in conventional devices is often provided by an expedient such as tying a knot in the lead-in conductor cord at a point on the cord immediately within the appliance housing. The knot is generally satisfactory for this purpose except that the sharp bends of the lead-in conductors at the knot are likely to lead to physical breakage and failure of the insulation. Further means must be provided in devices of the above description for preventing injury to the lead-in conductor insulation at the point of entry into the appliance housing due to wear and abrasion of the conductors against the edge of the conductor opening in the housing. This means is often provided by a rubber grommet, a small, doughnut-shaped, insulating and abrasion resisting member which lines the opening.

While the above features of conventional household appliances are satisfactory, it is an object of this invention to provide an improved electrical appliance which is characterized by lower first cost, greater simplicity, and a more pleasing appearance by means of a unitary structure which combines all of the above functions.

Accordingly, this invention generally consists in a support for an electrical appliance which provides heat insulation, electrical insulation at the terminal connections between the lead-in

2

conductors and the heater element, conductor strain relief, and conductor abrasion resistance at the point of entrance into the appliance.

For a more complete understanding of this invention, reference should be had to the following specification and the accompanying drawing in which Fig. 1 is an end view of an electrical heating appliance incorporating this invention; Fig. 2 is a bottom view of a portion of the appliance showing the support of this invention with the cover substantially cut away; Fig. 3 is a perspective view of the support of this invention before assembly, together with the cover therefor; and Fig. 4 is a sectional view of a portion of the appliance and the support of this invention through the section 4—4 of Fig. 2.

Referring more particularly to the drawing, in Fig. 1 there is shown an electrical heating appliance 1, such as a sandwich grille, incorporating the support 2 of this invention. Other supports 3 are provided which may be of the same structure as support 2, but are preferably of a simpler structure. The heating appliance consists of an upper section 4 and a lower section 5 having grids 6 between which food to be cooked may be placed. Electrical heating elements (not shown) are provided within the device adjacent the grids 6. Suitable handles 7 (only one of which is visible) are attached to lower section 5 for lifting and moving the device. The upper section 4 is hingedly mounted on lower section 5 by means of hinges 8, and a handle 9 is provided for opening the appliance by raising upper portion 4. Lead-in conductors 10 are provided which enter the device through the support 2. These lead-in conductors may comprise a conventional flexible rubber-covered two-conductor cord having a conventional plug connector 11 at the terminal thereof. The structure of handle 9 forms the subject of my concurrently filed co-pending patent application, Serial No. 143,729, and other features of the structure of this appliance, including the electrical interconnection structure between upper section 4 and lower section 5, form the subject of my concurrently filed co-pending patent application, Serial No. 143,728. Both of these applications are assigned to the same assignee as the present invention.

For a further description of this invention, attention is now directed to Fig. 2, a bottom view of a portion of the appliance showing details of the construction and assembly of support 2 and associated components; and Fig. 3 is a perspective view of the body and cover of the support before assembly. Referring to Fig. 3, the support 2 is comprised of a body portion 12 and a cover plate 13. Both of these parts may be made of a material such as a phenolic resin which serves as a good heat insulator and electrical insulator. The body portion 12 is of a cup shape, having a generally hollow interior with a slotted open-

ing at 14 for the entrance of conductors 10, shown in Fig. 2, but having protrusions 15, 16, and 17 extending from the inner walls of the hollow interior of the body to form a tortuous path for the conductors 10 between the entrance at 14 and a point at 18 within the support. This tortuous path provides the strain relief, referred to above, for the conductors 10 which, because of the natural stiffness of the conductors and because of the high coefficient of friction of the insulation material which covers the conductors, is very adequate for the purpose. Therefore, a normal pull on conductors 10 at a point outside of the support will not result in any force on the conductors beyond the point 18.

The protrusion 17 is more elaborate than the others since it includes a hub portion 19 and auxiliary protrusions 20 and 21 from the hub which form important portions of the walls of the tortuous passage mentioned above. Through the center of hub 19 there is an opening at 22 for the reception of a screw fastening 23 for connecting the support to the shell of the lower portion 5 of the heating device 1. This connection is best shown in Fig. 4. Cover plate 13 also has an opening at 24 for the reception of the same screw and is thereby assembled and held over the opening of the body portion 12 of the support. As shown in Fig. 3, and particularly in Fig. 4, the protrusions 15, 16, and 17 do not extend downwardly as far as the lower edges of the outer walls of the body portion 12. The lower edges 25 of the downwardly-extending walls therefore completely surround the periphery of cover plate 13 except for the discontinuity at opening 14, and these lower edges are in contact with the supporting surface since they extend downwardly farther than any other portion of support 2.

Beyond the point 18, the conductors 10 are separated and lead into spaces separated by a barrier 26 and respectively enclosed by the outer support wall and hub 19. In these spaces the conductors 10 are respectively connected at points 29 to a second pair of insulated conductors 28 by which power is conveyed to the electrical heating elements (not shown) within heating appliance 1. These connections may be made by any suitable method such as by tubular metal sleeves of conductive material into the respective ends of which the wires to be joined may be inserted. Each sleeve may then be mechanically deformed by pressure applied by a suitable tool to collapse the sleeve walls to establish a permanent, mechanically firm, and electrically conductive solderless connection. Since the barrier completely separates these electrical connections at 29, the tubular connectors themselves may be left uninsulated without any danger of a short circuit. The conductors 28 may be relatively inflexible as compared to conductors 10 and are preferably covered with insulation which is adapted to withstand the high temperatures expected within the heating device. This is in contrast to the insulation on conductors 10 which is not designed to withstand high temperatures but for other features such as flexibility and resistance to mechanical wear at ordinary temperatures.

Referring to Fig. 4, conductors 28 pass through an opening 30 in the upper wall of the body portion 12 and into section 5 of heating device 1 through an opening 31 therein. At this opening there is an outwardly-extending lip 32 which extends into a counterbore 33 in the upper sur-

face of body portion 12 at the opening 30. The flanged opening at 31 in the shell and the opening at 30 in the body portion provide a smooth wall passage for the conductors 28. The protrusion of lip 32 into the counterbore 33 also serves to prevent rotation of the support 2 with respect to the appliance about the axis of screw 23. In this connection, a small downwardly-projecting arch or dimple 34 extends from the lower surface of section 5 into a small circular depression 35 in the upper surface of body portion 12. Arch 34, therefore, also serves to position and prevent rotation of the support.

From the above description it will be seen that this invention provides an improved support for an electrical appliance which lowers the cost of the appliance, while, at the same time, provides greater simplicity and beauty by combining the functions of heat insulation, mechanical support, electrical insulation for the connection of lead-in conductors to the appliance, strain relief, and abrasion resistant entrances for the lead-in conductors.

Accordingly, while a particular embodiment of the invention has been shown and described, it will be obvious to those skilled in the art that various changes and modifications may be made without departing from the invention in its broader aspects and, therefore, it is the aim in the appended claim to cover all such modifications as fall within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

An electrical appliance including a lower shell and a plurality of supports under said shell, one of said supports comprising a body member including peripheral side walls which are continuous except for a conductor opening, partitions within the interior of said body member forming a tortuous passage leading away from said conductor opening into the interior of said body member, a pair of conductors leading from the exterior of said appliance into said passage, a second pair of conductors leading from within said appliance into said body member, an insulated interconnection area within said body member having an insulating barrier for providing two respectively insulated spaces therein, a connection between one conductor of one pair and one conductor of the other pair in each of said spaces, a hollow hub portion in said body, a fastening device within said hollow hub portion for fastening said body member to said shell, a cover plate for said support held in assembled relationship with said body portion by said fastening device to substantially completely close said body member, depressions on the surface of said body member adjacent to said shell and protrusions extending from the surface of said shell into said depressions to prevent rotation of said body member about said fastening device.

HOMER H. MILLER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,224,585	Abbott	Dec. 10, 1940
2,486,195	Munsey	Oct. 25, 1949

FOREIGN PATENTS

Number	Country	Date
450,673	Germany	Oct. 8, 1927